TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

JULY 1935

COVER ILLUSTRATION
Cellograph Halftone by Schoenwald Corp.

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CHECKING SPEED OF DIALS
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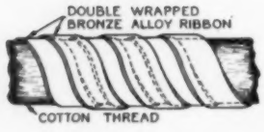
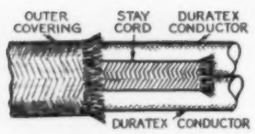
"No Wonder Stromberg-Carlson Sold More Cords UP TO MAY 1st THAN ALL LAST YEAR"



View showing double-wrapped conductor strand.



View showing sturdy stay cord construction.

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30-DAY LIFE FOR READERS AND ADVERTISERS

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- **Paid $408,000,000 in salaries and wages.**
- **Paid $97,000,000 in taxes.**
- **Paid $184,000,000 in dividends to 750,000 stockholders.**

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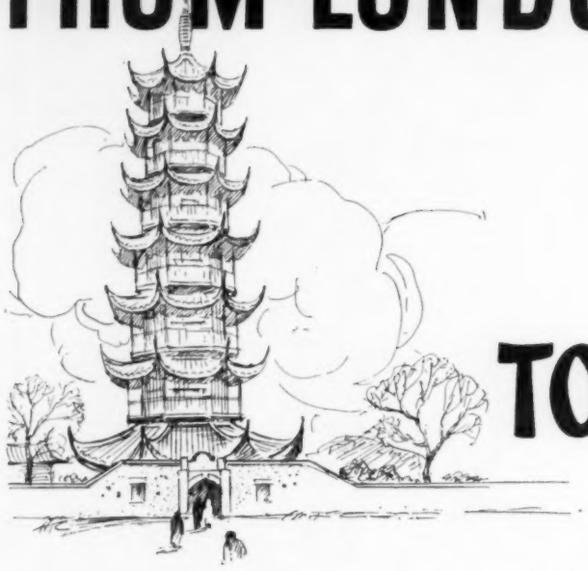

TO SHANGHAI

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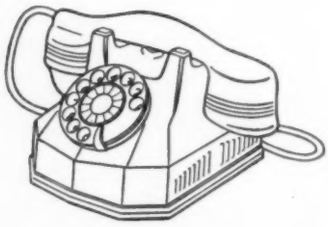

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TELEPHONE ENGINEER

MANAGEMENT -- ENGINEERING -- MAINTENANCE

JULY, 1935

Doing Your Bit?

THERE WAS an interesting and timely article in the news bulletin of the Pennsylvania State Telephone and Traffic Association which should be called to the attention of officials of every telephone company in this country.

The article emphasizes the value of and need for state telephone associations and takes to task non-members which reap the benefits of the associations' work at the expense of progressive companies who pay membership fees to maintain the organizations.

The article begins with a statement by Kiplinger that "trade associations now face a test. Only through them can industry now effect whatever measure of sèlf-government it wants. *Obviously some trade associations will do good jobs, because they are already well organized, because they represent industries which have real leaders, with some sense of economic statesmanship, some imagination . . . .*"

The Pennsylvania Association's bulletin then goes on to say to telephone men of that state—

"You have two trade associations — your state and your national. The part of the above statement in italic applies to your associations. They have never criticised government, state or national, unless they felt such criticism was constructive. They have always endeavored to cooperate with government. We have not asked that our industry be exempt from all responsibility during the present economic crisis, but we have insisted that it shall not be required to carry more than its proportionate share of the load. The success of your associations in protecting your interests before federal and state legislatures and regulatory commissions prove, we believe, that this is the wise policy. Our influence depends entirely upon our strength and our strength depends upon our membership. The more companies we represent, the greater our influence. If you are a member you are doing your part; if you are not a member you are reaping the benefits paid for by others. A participating membership costs but $5.00 a year and makes your company a member of both state and national associations. If you are a member, get your neighbor to join too. If you are not a member, be a good sport and pay for the benefits you enjoy."

Telephone associations, state and national have done good jobs because they are and have been well organized, as Mr. Kiplinger states, but the disappointing thing is that these organizations have been maintained by the same companies year in and year out, while companies not contributing financially or otherwise to their support have been receiving the benefits of their activities.

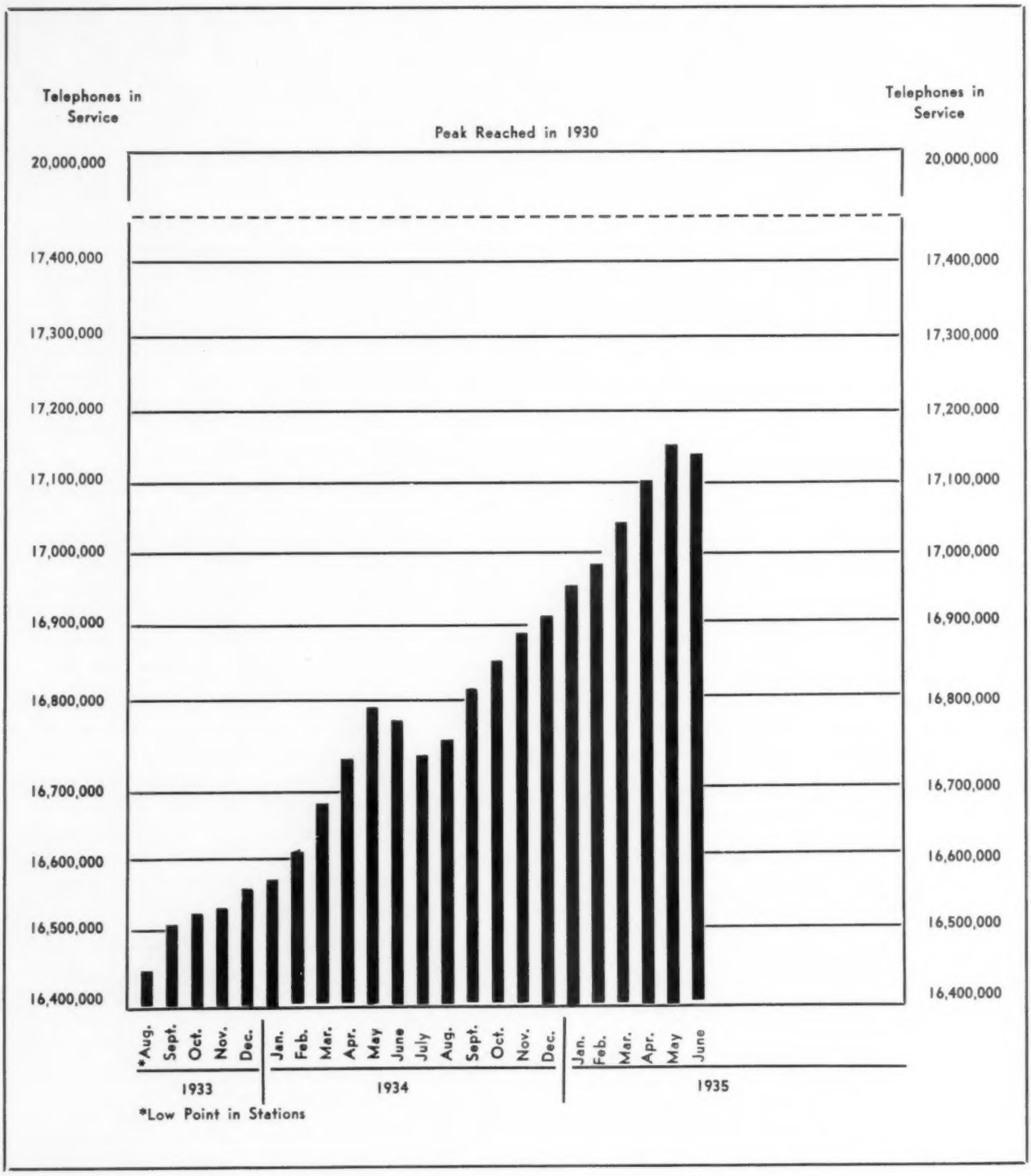
Certainly, the cost of association memberships is not excessive and the benefits are very great to the individual company that will take advantage of them. Furthermore, they can be multiplied at an expense which, if distributed to all of the companies of the Independent group, would make only a microscopic change in the financial results of any one of them.

Being members of state and national associations and paying for the benefits received from their work is not only a "sporting" proposition as the Pennsylvania bulletin suggests, but it is a matter of being fair not only to the telephone company itself but to the telephone industry as a whole.

R. C. Rees

EDITOR

Monthly Telephone Station Barometer



• "Tapping In" On Washington •

By
ROLAND C. DAVIES, Editor
Telecommunications Reports

THE prevailing political opinion in Washington, as exemplified in the Administration utility holding company bill, formed the principal motivating factor in the decision of the Federal Communications Commission in prohibiting interlocking directorships and offices in the four leading systems of the communications field—the Bell System, International Telephone and Telegraph group of cable, wire telegraph and radio systems, Western Union Telegraph Co. and the Radio Corporation of America's radiotelegraph companies.

This impelling motive was clearly shown in the interpretation of the Communications Act's Section 212—the provision giving the FCC authority over interlocking positions — in the opinions of the five-member majority of the FCC which were made public in early July to state their grounds for the banning of these posts. Two Commissioners—Telegraph Division Chairman, Irvin Stewart and Telephone Division Vice-Chairman, Thad Brown—dissented from this action of the Commission and held that this interpretation of Section 212 was not the intent of Congress and that the majority prohibition of the interlocking positions was a "futile act" because in each case the subsidiary companies were firmly controlled or wholly owned by the parent holding company so the interrelationships between the two would be undisturbed by doing away with interlocking posts.

• ● •

Asks Rehearing . . .

The officials were ordered to give up their interlocking positions by August 9. Already the Western Union Telegraph Co. has asked the Commission for a rehearing in the case of Newcomb Carlton, its board chairman, and E. Y. Gallaher, vice-president, who applied to serve as president and vice-president respectively of the Mexican Telegraph Co.

The majority of the Commission expressed their position in two opinions, one in which Chairman Prall and Commissioners Case, Sykes and Payne joined and another being a specially concurring opinion by Telephone Division Chairman Walker. The majority's views in support of their decision were strongest in their position that local or community interest was a duty of grave importance placed upon the official of a communications carrier and that an official in a high position of trust cannot adequately perform his duties to the best interests of several companies when he holds positions on the boards of several carriers. In his separate opinion, Commissioner Walker pointed out that it was a physical impossibility for an official to attend the monthly directors' meetings of companies, particularly when the carriers were located in various parts of the country.

• ● •

Sharp Divergence . . .

On the question of interpretation of the Congressional intent the majority opinions met with sharp divergence of views in the two dissenting positions of Commissioners Stewart and Brown. Stating that the Act's Section 212 was "restrictive," not expansive, the majority stated that Congress "was cognizant of the fact that many business organizations in this country used subsidiary corporations with interlocking directorates in the transaction of their affairs" and had used the holding company as a means of effecting control of many business enterprises. In his special opinion, Commissioner Walker took the position that the Splawn Report on interlocking directorships in the communications field demonstrated the Congressional intent to oppose "holding company dominance" and also cited the message of President Roosevelt on the utility holding company bill.

Commissioners Stewart and Brown, however, pointed out most forcefully that the language of Section 212 was identical in purport to that Section 20(a) of the Interstate Commerce Act which gives the ICC jurisdiction over interlocking posts in the transportation field and that both the Senate and House committees in their reports on the Communications Act cited that the Section had been copied from the Interstate Commerce Act. The two commissioners then gave in detail the policy of the Interstate Commerce Commission during the past 14 years in passing upon such posts in the railroad field—the ICC had approved 4,985 applications and denied 14 from 1921 to 1934—and also stressed that the 1921 Graham telephone consolidation act had given Congressional sanction to mergers of companies and interlocking relationships in that industry. The two dissenting commissioners stated much more fully the Congressional reports, and past precedents in the ICC actions and court decisions to prove their views on the actual Congressional intent. To an outside observer there is little question that the able dissenting opinions on this point offered a preponderance of evidential particulars as compared to generalized observations on the Congressional intent which were contained in the majority opinion—based, with the exception of the excerpts from the Splawn Report, on the Capitol Hill viewpoint on the utility holding company bill now before Congress.

• ● •

Competition Factor . . .

Another "parting of the ways" between the majority and dissenting opinions came over the majority viewpoint — which seemed a rather curious position —that the involved companies were competitive in the relationships of parent and subsidiaries in their communication service. The Bell System was cited as operating long distance lines by the A. T. & T. and the regional subsidiary companies in competition and it was charged that the A. T. & T. took the more lucrative toll lines. But Commissioner Stewart declared there was no basis for expectation of competition between the units of a system completely owned by the parent corporation and pointed to the ideal of the Bell System—"One System, One Policy, Universal Service."

Pointing out that "the furnishing of the best possible national and international communication service to which the people of the United States are entitled, is a tremendous task requiring at the same time large scale operations and intimate consideration of local affairs," Commissioner Stewart expressed the view that the prohibition of interlocking positions "may serve to retard the realization of the purpose" contained in Section 1 of the Communications Act for the Federal regulation to "make available to all the people of the United

(*Please turn to page 30*)

TELEPHONES in GUATEMALA

● Veteran telephone authority describes telephone service in progressive Central American country. Mr. Higgins recently returned from Central America and gives us first hand story of this interesting territory.

By
P. KERR HIGGINS

Typical Guatemala Village

GUATEMALA, perhaps the most interesting and progressive country in South America, combines the primitive and the modern to an amazing degree. The progress made by this nation during the past 10 years has been phenominal along all lines of industry, communications, road building, sanitation, etc.

In 1926 a noted visitor wrote in the National Geographic, "Guatemala City (the capitol) needs paving, water-works and sewers." What a transformation has taken place! All main streets are now well paved, fine sidewalks have been made, there are no wires or poles on the main streets and they now have a most beautiful "Plaza de Armes."

However, this article is for telephone folk and following a description of the Guatemala telephone system we will continue our story of the country itself.

Guatemala City has, or will have when the budget is complete, one of the most modern telephone systems in Spanish America. The equipment is automatic, of German manufacture, and while not embracing latest improvements is still very modern. The system is owned and operated by the government, and while officials are courtesy personified, still one cannot get the detail or photographs possible with private ownership.

The telephone directory is an interesting example of a great amount of advertising and is picturesque, to say the least. However, it contains much information of value to subscribers which we could copy to advantage. A few pictures are given of the telephone system such as "Sala de Selectores," "Sala de Maquinas," (Power Plant) and others of public works of the government. It also contains instructions for use of equipment, a complicated contract, postal and telegraph tariffs, railroad and steamship time tables; complete list of government departments, emergency telephones, production and export of crops and animals. Colored paper is extensively used in the makeup. The paper is very heavy and cumbersome and will probably be changed as the system grows. The type is very large, hence easily read. The telephone directory is a very profitable government project.

The Public Works Administration is under the direction of General don Jorge Ubico and the telephone, radio and telegraph division is under the direction of Senor Miguel M. Alvarado, who deserve the greatest credit for the very efficient and economical manner in which the public is served and courtesy shown their patrons.

In the city proper there are 1503 subscribers. In the provinces there are 11 central offices, with 307 subscribers. Long distance lines are in process of development and cover 6714 kilometers. Local service is $2.00 (gold), long distance in Guatemala 50 cents for first five minutes and 25 cents for each minute thereafter. Guatemala is not a large country and so distances are very short. From the Atlantic to the Pacific is only about 275 miles. All main cables in the capitol are underground, both for communication and for light and power. Outside of the city, magneto service is given. Due to the fact that about 75 per cent of the population are Indians and very poor, telephone development is limited.

Now, getting back to the other points of interest. Streets in Guatemala are immaculately clean and the stores are attractive. A visitor must needs go to the market place to realize he is in what was only a few years ago a primitive city. Here he gets a cross section of native life and what he may expect to see when he tours the interior in modern autos over fairly good roads, but still narrow and with too many curves. However, one marvels at what has been accomplished in such a short time. If the progress made by this nation during the past 10 years is equalled in the next 10, it will complete for first place in "Hispano-America."

In the interior, the natives (mostly Indian) are still living and worshipping in the 14th Century. Hence, anyone wishing to see unspoiled Guatemala must go there very soon. The tours of the Interior are conducted by Senor Al-

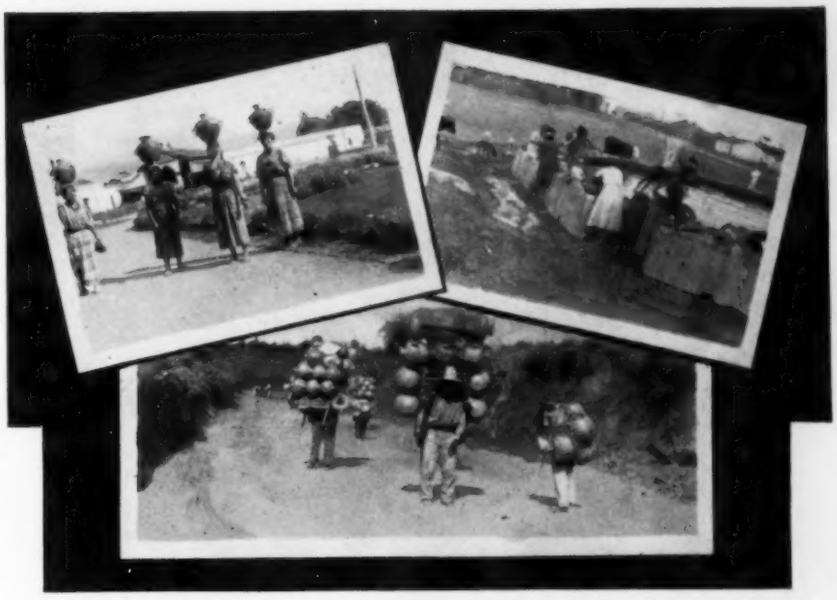
fred S. Clark of Guatemala City and are very comprehensive, efficiently conducted and reasonable in price. Nothing is left undone to make the trip enjoyable, interesting and comfortable. Stops are made at Inns typical of the country, Spanish style with fine patios and native entertainment. Splendid modern autos are used and each car is provided with an excellent chauffeur and guide.

The important exports of Guatemala are coffee and bananas. When we visited the coffee plantations and saw with what infinite care the coffee beans were selected and prepared, we ceased to wonder at its fine quality. The coffee trees are in bloom only one day—a beautiful sight. These are protected from the sun by much larger trees. The fruit is picked one berry at a time and flumed down to the "beneficia" or plant, often quite a long way off. Here they are fermented and washed and any berries that float are thrown into the discard. They are then taken to a concrete patio and carefully spread out on the ground to be thoroughly sun-dried, hulled, graded and polished, and sacked ready for export. It is claimed that one hundred million pounds of coffee are exported annually. Revenue from coffee increased from $784,722 in 1931 to $1,032,262 in 1934. The largest customer is the United States.

This industry takes first place, the banana industry takes second. We never imagined there were so many bananas in the world. They are grown on the low, swampy lands on the Atlantic and Pacific coasts. These lands have been drained and what was formerly a fever infested land is now the show spot of the tropics. The export of bananas is more than a hundred million bunches a year and the act of cutting, hauling to the depository and the work of the pick-up train, which takes them to and loads them on the steamer by means of automatic cradles must be begun and completed the same day. Each bunch carries an average of 300 bananas. The plant matures from a selected sucker in about nine months and each petal of the blossom represents a banana. The old plant is cut down and left as fertilizer and from the mother plant comes the new suckers, the weak ones being cut down and the strong left.

Local transportation is largely carried on by the native Indians with a few mule trains. The International Railways have a very efficient system, but due to the nature of the country it is not extensive.

The Indians are small in stature and do not wear shoes, but possess great endurance and can carry 200 pounds on their backs at a dog trot of from 30 to 40 miles per day. Every road seems



Left: Drawers and Carriers of water. Right: A public laundry in Guatemala. Bottom: Typical scene on any Guatemala road.

crowded with such "cargadores," sometimes one or two, then a whole family and again large groups, all carrying their produce to some market miles away.

We pass very quickly from the modern to the primitive as the latter begins at the outskirts of the capitol. Every village has attractions of its own and every tribe has its own peculiar dress.

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SOMETHING NEW— ENTIRELY DIFFERENT.

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7th Avenue & 18th Street

Guatemala, C. A.

Perhaps the most interesting cities of the interior are Antiqua and Chichicastenango. The land is full of extinct volcanoes, only one being active, "Feugo" and the history of these and the destruction they have wrought can be seen everywhere in the interior.

Lake Atitlan is one of the most beautiful lakes on the continent and has the bluest water I have ever seen, only comparable by the Blue Grotto of the Isle of Capri.

The ruins of the past centuries are well preserved and show that a very fine civilization existed here centuries ago. At Chichicastenango, the Padre has one of the finest collections of unpolished jade on this continent.

Each community has its own market and its own public laundry, where the women wash their clothes on flat stones.

The men carry their loads on their backs. A wide band is worn around the forehead, and the load is connected to this band by means of straps. The women carry their loads on their heads, leaving the back free for the ever-present baby, which is carried in a "sling" and can be changed in position as needed. We saw one woman carrying a huge basket containing 60 dozen eggs, swinging her arms as she trotted along and with a baby on her back. Imagine such a load on her head and going at a dog trot for miles. Such sights and the native living conditions make one glad to be a citizen of the "Lord's Country." Thus ended what might be, but is not, a tale from the "Arabian Knights."

BASIC Telephone Electrical THEORY

● Part VII of Mr. Burden's article dealing with basic theory of electrical engineering as applied to the telephone field discusses polar and rectangular vectors.

By
B. C. BURDEN
Transmission Engineer
Lincoln (Neb.) Tel. & Tel. Co.

IX

BEFORE we can continue with our discussion of computations of parallel impedances, we must briefly review the subject of polar and rectangular vectors. This is necessary, otherwise it would be difficult, if not impossible, to understand the methods which are used in solving for the total impedance of a circuit containing several impedances in parallel.

We have previously shown how lines may be used to represent the magnitude and direction of forces and when so used are known as **vectors.**

There are two methods of representing "vector quantities" which are known as the **polar method,** and the **rectangular method.** Both of these methods are required in solving problems involving impedances in parallel.

A **polar vector** is one which represents the magnitude and direction of a force by means of single vector line the length of which represent the magnitude of the force and the angle which this line makes with a horizontal reference line defines the direction of the force. Fig. 26 illustrates a polar vector and the method of expressing this vector mathematically.

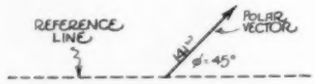


Fig. 26. Polar Vectors.

In a previous paragraph it has been pointed out that when we discuss an impedance we must think of it as having direction (angle of lead or lag) as well as magnitude. Therefore when we express the vector shown in Fig. 26, in the **polar form** we tell the whole story about it by stating it mathematically as $Z \angle\varnothing = 141^{w}\angle 45°$. That is, an impedance of 141 ohms with angle of lag of 45°.

positive angle and a negative angle (angle of lag or lead) it is customary to show angles of lag (positive) as $\angle\varnothing$, and angles of lead (negative) as $\angle\overline{\varnothing}$.

A **rectangular vector** expression consists in showing an impedance in terms of its R and X components; i. e., $Z \angle\varnothing = R + jK$. The symbol (k) is used to indicate that the quantity X is 90° out of phase with the quantity R; hence, cannot be added directly (numerically) to R but must be added vectorially.

This symbol is somewhat confusing when first considered as we are inclined to associate it in our mind with other algebraic symbols and treat it in the same way. Its use will be made clear if we consider it merely as a warning sign to caution us that we cannot add the R and X terms numerically together. It permits us to associate these terms by means of the plus sign for convenience in certain mathematical steps, and yet shows that being 90° out of phase the two terms can be added together **only vectorially.** (j) has no real numerical value.

Referring back to Fig. 26, we would express the polar impedance of 141 ohms at an angle of 45 degrees in rectangular form as:

$$R + jX = 100^{w} + j100^{w}$$

It should be noted that the rectangular form like the polar form tells us the whole story about an impedance. For example, if we are given an impedance expressed in the form $\varnothing$ we can by simple trigonometry (as previously explained) determine the magnitude of both the R and X components of this impedance, or if given an impedance expressed in the rectangular form R + jK we can by simple trigonometry determine the impedance and phase angle.

In solving many types of problems in AC work we have occasion to add, subtract, divide, multiply, raise to a power, or extract a root, of several impedances. Inasmuch as the impedances may be and usually are of different phase angles we cannot do these operations in the same manner as we can when dealing with direct current resistances but we must do these operations vectorially so as to take into account the difference in phase angles between the impedances considered. We find that impedances **should be expressed in the polar form to be divided, multiplied, raised to a power, or when a root is to be extracted. For adding or subtracting operations, impedances should be expressed in the rectangular form.**

The following table illustrates the use of the two methods and the rule for handling each of the operations.

Operation	Use	Rule
Addition	Rectangular	Add all the R components together and all the X components together.
Substraction	Rectangular	Subtract the R components to get the net R, and subtract the X components to get the net X.
Multiplication	Polar	Multiply the magnitude of the impedances and add the angles.
Division	Polar	Divide the magnitude to the desired power, and multply the angle by the power.
Raising to a Power	Polar	Raise the magnitude to the desired power, and multiply the angle by the power.
Finding a Root	Polar	Obtain the root of the magnitude, and divide the angle by the desired root.

The following examples illustrate the use of the above rules:

Example No. 1. Add two impedances together whose resistance components are 100 and 200 ohms respectively and whose inductive reactance components are 50 and 100 ohms respectively.

$$\begin{array}{ll} R_1 + jX_1 & 100^{w} + j200^{w} \\ R_2 + jX_2 = & \underline{50^{w} + j100^{w}} \\ \overline{R + jX} & \overline{150^{w} + j300^{w}} \end{array}$$

Example No. 2. Subtract two impedances whose resistance and reactance components are the same as those in

example No. 1.

Change signs and add—

$$\begin{array}{rr} R_1 + jX_1 & 100^w + j200^w \\ -R_2 - jX_2 = & -50^w - j100^w \\ \hline R + jX & 50^w + j100^w \end{array}$$

Example No. 3. Multiply two impedances whose values are $100^w \angle 45°$ and $200^w \angle 35°$

$$Z_1 \angle \varnothing_1 \times Z_2 \angle \varnothing_2 = Z_1 \times Z_2 \angle \varnothing_1 + \angle \varnothing_2 = Z \angle \varnothing$$

$$100^w \angle 45° \times 200^w \angle 35° = 100 \times 200 \angle 45° + \angle 35° = 20\,000^w \angle 80°$$

Example No. 4. Divide an impedance of $200^w \angle 50°$ by an impedance of $20^w \angle 20°$.

$$\frac{Z_1 \angle \varnothing_1}{Z_2 \angle \varnothing_2} = Z \angle \varnothing$$

$$\frac{200 \angle 50°}{20 \angle 20°} = 10 \angle 30°$$

Example No. 5. Square an impedance of $12^w \angle 30°$.

$$(Z_1 \angle \varnothing)^2 = Z_1^2 \ (\angle \varnothing \times 2) = Z \angle \varnothing$$

$$(12^w \angle 30°)^2 = 12^2 \ (\angle 30° \times 2) = 144 \angle 60°$$

Example No. 6. Find the square root of an impedance of $64^w \angle 60°$.

$$Z_1 \angle \varnothing = Z \angle \varnothing$$

$$64^w \angle 60° = 8^w \angle 30°$$

In working with impedances expressed in the rectangular form it is customary to refer to the R component as the **real** part, and the jX component as the **imaginary** part.

In solving problems involving impedances in parallel we use the same general equation as is used for solving total resistance of a number of resistances in parallel, the only difference being that we deal with impedances and we must therefore take into account the vector relation between the various impedances considered. The general equation for solving two or more impedances in parallel is as follows:

Eq. No. 1 $$Z = \frac{1}{\frac{1}{\overline{Z}_1} + \frac{1}{\overline{Z}_2} + \frac{1}{\overline{Z}_3}} \text{ etc.}$$

We have previously shown that $Y = \frac{1}{Z}$ and we may therefore change the above equation to read:

Eq. No. 2 $$\overline{Z} = \frac{1}{\overline{Y}_1 + \overline{Y}_2 + \overline{Y}_3} \text{ etc.}$$

The term $\overline{Y}$ which is the admittance of the impedance under consideration must be broken up in its real and imaginary components (the same as is true of an impedance) before the separate admittances can be added together in Eq. No. 2.

The Front Cover

THERE'S always time for a smile in this telephone business — a smile and a pleasant word. Face to face, a smile lights up our casual contacts. Over the telephone, it adds a warmth to what is said. In correspondence, a smile can break through cold type. Virginia Pearson Herrick and Mae B. Butler, tellers for the Bell Telephone Co. of Pa., in Philadelphia, are adding an extra something which makes their company's a live, friendly interesting service to the customers they meet. Illustration courtesy, The Telephone News, Philadelphia.

The real part of the admittance is the **"conductance"** and is expressed symbolically as G, and the imaginary part is the **"susceptance"** and is represented by the letter B. Like the relation between R and X, these two components are at right angles to each other; hence, this must be shown by the symbol j. That is :

Eq. No. 3 $\overline{Y} = G + jB$

In order to permit vectorially adding the real and imaginary parts of an admittance together these components must show the phase relation between Z and R_1 and Z and X. Therefore we find that:

Eq. No. 4 $$G = \frac{R}{Z^2}$$

Eq. No. 5 $$B = \frac{-X}{Z^2}$$

Now substituting the relation shown to Eq. No. 4 and Eq. No. 5 we get the working equation which can be used to find the total impedance of several impedances in parallel; i. e.,

Eq. No. 6 $$\overline{Z} = \frac{1}{\left(\frac{R}{Z^2} + j\left(\frac{-X}{Z^2}\right)\right)_1 + \left(\frac{R}{Z^2} + j\left(\frac{-X}{Z^2}\right)\right)_2} \text{ etc.}$$

Convention Schedule

United State Independent Telephone Association, Stevens Hotel, Chicago, October 8, 9, 10 and 11.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, November 14 and 15.

The following example will illustrate the use of equation No. 5 in solving for the total impedance of several impedances in parallel.

Example No. 1. What is the total impedance of two impedances in parallel having the following values: $Z_1 = 300^w \angle 30°$, $Z_2 = 400^w \angle 45°$.

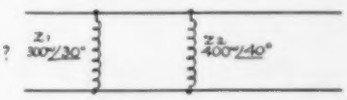


Fig. 27. Parallel impedance computation.

Equation to Use

$$\overline{Z} = \frac{1}{\frac{1}{Z_1} + \frac{1}{Z_2}} = \frac{1}{\left(\frac{R}{Z_1} + \left(j\frac{-X}{Z^2}\right)\right)_1 + \left(\frac{R}{Z^2} + \left(j\frac{-X}{Z^2}\right)\right)_2}$$

Determine R and X Components of Both Impedances

$R_1 = Z_1 \cos \varnothing = 300 \times 0.966 = 259.8^w$
$R_2 = Z_2 \cos \varnothing = 400 \times 0.707 = 282.8^w$
$X_1 = Z_1 \sin \varnothing = 300 \times 0.5 = 150.0^w$
$X_2 = Z_2 \sin \varnothing = 400 \times 0.707 = 282.8^w$

Substitute in Equation

$$\overline{Z} = \frac{1}{\left(\frac{259.8}{300^2} + \left(j\frac{-150}{300^2}\right)\right)_1 + \left(\frac{282.8}{400^2} + \left(j\frac{-282.8}{400^2}\right)\right)_2}$$

$$\overline{Z} = \frac{1}{(.0028 + j(-.0016))_1 + (.00176 + j(-.00176))_2}$$

$$\overline{Z} = \frac{1}{(.0028 + .00176) + j(-.0016 + -.00176)}$$

$$Z = \frac{1}{.00456 + j(-.00336)}$$

Convert to Polar Form

$$\overline{Z} = \frac{1}{\sqrt{.00456^2 + (-.00336)^2}}$$

$$\tan \varnothing = \frac{X}{R} = \frac{.00336}{.00456} = 0.736$$

From trigonometric table $\varnothing = 36°$

$$\overline{Z} = \frac{1}{.0056 \angle 36°}$$

$$\overline{Z} = \frac{1}{.0056 \angle 36°} = 178.6^w \angle 36°$$

(To Be Continued)

LINE and DESK

Ray Blain, Member A. I. E. E., Editor

Q.—When pulling-in aerial cable how much overlap of the ends should be allowed for splicing?

A.—Ordinarily about three feet will be satisfactory for non-quadded cables.

Q.—What is the type "C" knob sometimes referred to in drop wire work?

A.—Knob is really a misnomer for the "C" knob for it is actually two pieces of porcelain each with two grooves to hold the wires when the cleat is clamped together with a screw in mounting. This cleat type fixture is ideal for making the last attachment on a house where the drop wire enters the tube. There are numerous other places in drop wire work where these cleats may be used to advantage.

Q.—What is the necessity for a repeating coil in common battery trunk circuits?

A.—When the repeating coil is not used in a trunk circuit connecting two common battery switchboards, the proper poling of the two batteries is necessary. Then if the two grounds are of unequal potential there is a circuit unbalance destructive to good transmission. This unbalance due to unequal ground potential is likely to be commonly encountered near large cities due to power and traction systems.

Q.—Why is it necessary to have a relay rack for a multiple type switchboard of three or four positions?

A.—There is space inside a multiple switchboard cabinet for the cord relays and equipment only, so necessarily the line and cut-off relays and other equipment must be mounted on a rack external to the switchboard. The cord relays on most feature switchboards are also usually mounted external to the switchboard due to space not being available inside the cabinet for the large number of cord relays required on this type switchboard.

Q.—How should aluminum paint be mixed for painting iron work around the telephone exchange?

A.—After much experimenting we have decided that the best results are obtained when the aluminum powder is mixed with either banana oil or a good grade of varnish. This paint is sometimes mixed with linseed oil which is fairly satisfactory for painting wood but undesirable on metal as it does not cover the surface satisfactorily and tends to run before drying. Aluminum paint should be mixed fairly thick for use on iron.

Q.—Can you tell us where we may send electric soldering irons to have them propely repaired?

A.—We believe that any equipment should be returned to their manufacturer for repair if possible. However, the electric soldering iron of the present is so simple that most telephone companies make their own repairs locally. If standard soldering irons of good manufacture are purchased, new points and heating elements may be obtained and to change these parts is a very simple task. The point and heating element is about the only parts which ever require replacement on a good electric soldering iron.

Q.—What method should be employed in connecting clay conduit and iron pipe in the middle of a conduit section?

A.—We do not believe that this practice should ever be considered except as a last resort, made necessary due to crossing under a road which cannot be tunneled or to clear some obstruction. If extreme care is taken the iron pipe can generally be cemented into the clay conduit so as to make a good connection or a special conduit casting may be purchased to make the connection.

Q.—What is the principle of the dry type rectifier and is this type considered satisfactory for changing batteries in telephone work?

A.—We assume that you have reference to the copper oxide rectifier which makes use of the principle that a disc of copper coated with a layer of copper oxide will allow current to flow from the oxide to the copper but not in the reverse direction. This is the most simple form of rectifier made. Unless damaged by heavy currents this type rectifier has almost an indefinite life and has been used quite successfully in telephone work for the past several years.

Q.—How should an underground conduit map be drawn to indicate the number of used and vacant ducts in each manhole section?

A.—Some telephone companies have a numbering scheme for their conduit and indicate on the cable the duct it occupies. The conduit map or a notation on the cable map shall designate the number of ducts in each section such as 4-MCD, meaning 4 multiple clay ducts, or 2-CWD, meaning 2 creosoted wood ducts. When this arrangement will not suffice we suggest drawing a symbol representing the ducts by squares and place a dot or circle in each square which is in use. One of these symbols should be placed opposite each section of conduit on the drawing.

Q.—We are in need of a furnace to heat beeswax and paraffin in the office for use on switchboard corps and prefer one that will not be as noisy as the usual type. What do you suggest?

A.—There are many good furnaces on the market which use coal oil or gasoline for fuel and if used properly they do not ordinarily cause excess noise. Natural gas would be ideal for use in your case if available. We often use a common electric hot plate for heating wax. This method is somewhat slower than a plumber's furnace but is safe, clean and noiseless. When starting to heat a kettle of wax with the hot plate the kettle should be well covered for the wax heating slowly from the bottom will expand and finally burst the hard surface and sometimes spout to the ceiling.

Q.—We desire to know whether we should use high or low capacity paper insulated cable in our exchange. We have a number of grounded service lines entering our cables at the corporate limits of our community. Our experience has been that these grounded lines cause our cable to become noisy and induce considerable crosstalk therein. High capacity cable with a single paper wrapped insulation of the conductors is much cheaper than low capacity double paper wrapped insulation though we feel that the latter type would materially reduce our noise and crosstalk trouble and that in our case the additional cost would probably be justified.

A.—We are believers in the high capacity single wrapped cable and feel sure it should give good service

(*Please turn to page* 34)

FCC Adopts Revised ACCOUNTING System

● Accepts numerous exceptions made by telephone industry. Effective January 1, 1936. Issues opinion on interlocking directorate decision.

THE Federal Communications Commission on June 19 adopted the Unified System of Accounts for Telephone companies without a revision of its fundamental theories on the original cost recording of telephone plant.

While the adopted accounting system contained a number of technical revisions to make the system more practical and workable, there was no revision of the section calling for the computation of depreciation rates without allowance of service value loss of future installed property and contributions to telephone plant.

Class A and B companies were sent copies of the new accounting system together with Telephone Division Order No. 7-C placing the new system in effect on January 1, 1936.

Announcement of the adoption of the Uniform Accounting System was made by the Telephone Division as follows:

"The Telephone Division of the Federal Communications Commission announces the adoption, on June 19, 1935, of a Uniform System of Accounts for Telephone Companies to be known as 'Issue of June 19, 1935, Effective January 1, 1935.'

"Such classification replaces the one tentatively adopted as of May 1, 1935, and to which exceptions were invited. It includes such recommended changes embraced in the exceptions as were acceptable to the Division.

"The accepted changes are prevailingly technical, affecting primary accounts, rather than of a nature involving changes in fundamentals."

The clause dealing with original cost was broadened to include franchises, patent rights and rights of way beside telephone plant and in conjunction with telephone plant there was added the phrase "together with preliminary expenses incurred in connection with the acquisition." Likewise, in the Telephone Plant Acquisition Adjustment (Account 100.4) the phrase "preliminary expenses incurred in connection with the acquisition" was added.

It is believed the United States Independent Telephone Association will again submit its views to the Telephone Division on the effect of the new accounting system upon Independent companies having exchanges in rural communities.

The Telephone Division adopted the following exceptions of the accounting system:

The instruction relating to a work order system to be effective January 1, 1936, contained in the initial accounting system draft, issued May 1, was omitted and will receive a special study.

The accounts receivable from and payable to affiliate companies were revised to provide for showing in the balance sheet of the net amount receivable and payable to by individual affiliate companies.

The cost of patents acquired in an undeveloped state to be shown in the original draft as suspense expense pending development and the cost of patents of doubtful service value to be chargeable to surplus were omitted from the final accounting system.

House cable was classified as aerial cable and corrections were made in several accounts.

The separate operating expense account for regulatory expense, included in the May 1 draft, is omitted from several accounts in the system.

Three additional operating expense accounts are provided for Class A companies. They are shop repairs and salvage adjustments; general supervision, engineering and toll expenses and test desk work. These accounts were provided to include certain accounts previously included in the maintenance accounts.

Accounts 602.2, 602.3 and 602.6 were revised to eliminate reference to maintenance of right of way and appropriate provision for such expenses were made in accounts 602.1 and 602.7.

Other instructions and accounts also were revised to meet the objections of telephone companies and state commissions.

Telephone Division Order No. 7-C reads as follows:

"*Whereas* under our Order No. 7, it was ordered that representatives of the several States and of the commissions or regulatory bodies thereof having jurisdiction over telephone carriers therein, and all other parties at interest, should have until October 1, 1934, within which to file exceptions or objections to the report of the Interstate Commerce Commission, rendered in its Docket No. 25705, affecting accounting rules for telephone companies, or to suggest amendments or changes in such accounting rules for telephone companies; and that all exceptions, objections, and suggestions should be filed in writing and 15 copies thereof provided within the time therein specified.

"*Whereas* under our Order No. 7-A, it was ordered that an extension of time be granted to November 1, 1934, for the filing of such exceptions, objections, or suggested amendments; and that Order No. 7 be set down for hearing and oral argument by the parties on November 16, 1934, before the Telephone Division in its hearing room at Washington, D. C.;

"*Whereas* certain exceptions or objections to the report of the Interstate Commerce Commission rendered in its Docket No. 25705, and certain suggested amendments or changes in such accounting rules, were filed pursuant to said Orders No. 7 and No. 7-A, by parties at interest;

"*Whereas* a hearing was held and arguments were heard pursuant to said orders, which said orders are hereby referred to and made a part hereof;

"*Whereas* a draft of a Uniform System of Accounts for Telephone Companies, known as "Issue Effective January 1, 1936," was adopted by the Telephone Division by its Order No. 7-B of May 1, 1935, which said draft and order were submitted to all parties in interest;

"*Whereas* by notice issued on May 1, 1935, the Telephone Division announced that telephone carriers and other interested parties might file exceptions to such accounting rules on or before May 16, 1935, and by the same notice announced a conference with State commission representatives and representatives of the telephone carriers on May 16, 1935, for the consideration of any exceptions filed; and

"Whereas exceptions were filed and such conference was held:

"Now therefore, after hearing the evidence and arguments and having held the conference, and being fully advised in the premises and pursuant to its findings, the Telephone Division does make the following orders, to wit:

"It is ordered, That Order No. 7-B, together with the draft of the Uniform System of Accounts for Telephone Companies, known as 'Issue Effective January 1, 1936,' and promulgated on May 1, 1935, be, and the same is hereby, superseded by this Order No. 7-C, and by a Uniform System of Accounts for Telephone Companies, hereafter called 'Issue of June 19, 1935, Effective January 1, 1936.'

"It is further ordered, That the report of the Interstate Commerce Commission in its Docket No. 25705 affecting accounting rules for telephone companies and the Uniform System of Accounts for Telephone Companies prescribed for the use of telephone companies by Division 4, of the Interstate Commerce Commission on the 12th day of November, 1932, and known as 'First Revised Issue,' be amended or changed; that said 'First Revised Issue,' as amended or changed shall be embodied in printed form to be hereafter known as 'Issue of June 19, 1935, Effective January 1, 1936,' a copy of which is now before the Commission, and is hereby approved; that a copy thereof duly authenticated by the Secretary of the Commission be filed in its archives, and a second copy thereof, authenticated in like manner, in the office of the Accounting, Statistical and Tariff Department; and that each of said copies so authenticated and filed shall be deemed an original record thereof.

"It is further ordered, That the Uniform System of Accounts for Telephone Companies embodied in said 'Issue of June 19, 1935, Effective January 1, 1936' be, and the same is hereby, prescribed for the use of telephone companies having average annual operating revenues exceeding $50,000, subject to the provisions of the Communications Act of 1934, in the keeping and recording of their accounts; that each and every such carrier and each and every receiver or operating trustee of any such carrier be required to keep all accounts in conformity therewith; and that a copy of said 'Issue of June 19, 1935, Effective January 1, 1936' be sent to each and every carrier and to each and every receiver or operating trustee of any such carrier.

"It is further ordered, That in order that the basis of comparison with previous years be not destroyed, each and every such carrier and each and every receiver or operating trustee of any such carrier shall, during the 12 months from the time that the said 'Issue of June 19, 1935, Effective January 1, 1936' becomes effective, keep and maintain, in addition to the accounts hereby prescribed, such portion or portions of its present accounts as may be necessary for the purpose of such comparison; and during the same period, shall maintain such groupings of the primary accounts hereby prescribed as may be necessary for that purpose.

"It is further ordered, That nothing herein contained shall be construed as prohibiting or excusing any such carrier or receiver or operating trustee of any such carrier, from subdividing the accounts hereby prescribed in the manner ordered by any State commission having jurisdiction or to the extent necessary to secure the information required in the prescribed reports to such commission.

"It is further ordered, That said 'First Revised Issue' prescribed by Division 4, of the Interstate Commerce Commission, as aforesaid, shall remain in full force and effect up to and including the 31st day of December 1935, and that said 'Issue of June 19, 1935, Effective January 1, 1936' herein prescribed, as aforesaid, shall become effective on the 1st day of January 1936."

Dual Directorate Decision

Explanation for its recent decision forbidding 10 prominent officials in the communications industry to hold plural directorate positions after August 9, was given in an opinion made public July 5 by the Federal Communications Commission.

The opinion explaining the decision covered 69 typewritten pages, 44 of which were given to dissenting opinions of Commissioners Stewart and Brown. Telephone officials subject to the decision are Walter S. Gifford and E. F. Carter, president and vice-president, respectively, of the American Telephone & Telegraph Co.

Discussion of the Commission's decision and opinion is made by Roland C. Davies, editor of *Telecommunication Reports* in his column "Tapping In On Washington" on page 13 of this issue.

Tariff Order No. 12 Issued

The Commission today adopted Commission Order No. 12, approving Tariff Circular No. 1, containing rules governing the construction, filing and posting of tariffs relating to interstate and foreign wire or radio communications by carriers subject to the Communications Act of 1934.

A conference between carrier representatives and representatives of state commissions and of this Commission was held at the office of the Commissioner in Washington, D. C., on June 6, 1935, at which conference rules previously served on State commissions and on carriers were considered. The rules adopted today are to become effective September 1, 1935, a date sufficiently in advance to allow interested parties time within which to suggest amendments of the rules and to give this Commission an opportunity to revise the rules, if necessary, before they become effective.

These rules, when effective, will automatically supersede Commission Order No. 11 relating to the notice required in filing tariffs.

Hearing on Coaxile Cable

The application of the American Telephone and Telegraph Company and the New York Telephone Company for authorization to construct a coaxile cable from New York to Philadelphia, as a part of the experiment to determine the tufure possibilities of the coaxile cable in television as well as telephone and telegraph use, has been set for hearing before the Commission on banc for July 15, 1935.

All parties interested in, or who may be affected by, the use of the coaxile cable, if and when it may be devoted to general commercial use, will, upon application to the Commission, be afforded opportunity to participate in the hearing.

The Commission feels that it is in the public interest to ascertain in advance the facts surrounding the future uses to which the cable may be put.

Report Pecora Offered Post

According to newspaper reports Ferdinand Pecora has been requested by President Roosevelt to become chief counsel for the Federal Communications Commission's investigation into the American Telephone and Telegraph Co.

Pecora, now on the New York Supreme court bench, was President Roosevelt's dinner guest at the White House recently. He has been in conference with Senator La Follette, Wisconsin radical, and Felix Frankfurter, a chief of the brain trusters. After the passage of the 1934 stock exchange act Pecora accepted a one year term on the SEC. After serving six months at the job paying $10,000 a year he resigned to take the $25,000 a year judgeship offered him by Gov. Lehman. The A. T. and T. inquiry post would pay only $9,000 a year.

Investigation into A. T. and T. was authorized last year by congress in passing the Rayburn bill creating the communications commission. Efforts to obtain counsel to conduct the investigation thus far have been unsuccessful.

CHECKING Speed of DIALS

By
H. BROADWELL
Telephone Apparatus Dept.
Bell Telephone Laboratories

IN CERTAIN parts of the telephone system such as remote step-by-step areas and manual areas having step-by-step P. B. X.'s, it is not always feasible to provide the regular central-office type dial testers* for checking the speed of subscriber's dials. A form of dial tester which can be carried in the maintenance man's tool-kit, and which works on the stroboscopic principle, has therefore been developed for these dials. The device consists of a target (Fig. 1) which can be attached to the finger wheel of the dial, and a tuning fork in a case (Fig. 2) with an opening through which to view the devisions on the target.

In using the stroboscope the maintenance man winds the dial, partly depresses the button in the case so that he can see past the fork, and sights the fork on the reference mark on the target. He then fully depresses the button to start the fork, and releases the dial. If a row of divisions on the target appears to stand still when viewed through the fork, the dial is running at the speed for which that row was figured. If the divisions appear to run in the direction of the arrow located alongside the row, the speed is within the limit which the row represents, and if in the opposite direction, the speed is outside that limit. The velocity of the motion as seen through the fork indicates the extent of the deviation from the speed represented by the row.

The upper and lower limits of speed established for the subscriber's dial as most satisfactory from both circuit and design standpoints are eleven pulses per second, and eight pulses per second repectively. These limits, known as "test" limits, are represented by two rows of divisions on one side of the removable disc on the target. If the dial is found to run faster than the maximum or slower than the minimum speed, the dial governor is readjusted to within a closer set of speed limits, 9.5 and 10.5 pulses per second, in order to allow a margin for future changes in speed due to wear and the like. These "readjust" limits are represented by two rows of divisions on the other side of the target disc. The disc is readily reversed for selection of the proper limits by unscrewing the knurled knob which clamps it to the base.

The stroboscope is very sensitive to slight changes in speed, and it was found necessary to employ non-uniformly spaced divisions to compensate for the decrease in the velocity of the dial as it unwinds. The width of each division was determined separately from data obtained by testing a representative lot of dials. The targets were then laid out on a large scale and photographically reduced.

In designing the target mounting, it was necessary to take into account the importance of not marring the finish of the new colored dials. A push button was provided in the knob which can be depressed to expand the fingers and prevent their marring the finish while the target is being mounted. The flexibility of the fingers also insures a satisfactory grip on dials having the ordinary black finish.

The tuning fork vibrates at fifty cycles per second. Depressing the starting button in the case rotates a ratchet wheel having teeth arranged to lift flat springs which distend the prongs of the fork and then drop back into the space between the teeth. The case for the fork consists of a box and cover which shield the mechanism and exclude dirt when the fork is not in use. Sliding the cover partly off the box provides an opening for viewing the target.

*The 51-type Dial Tester (Record, August 1927, p. 427), and the 50A Dial Tester.

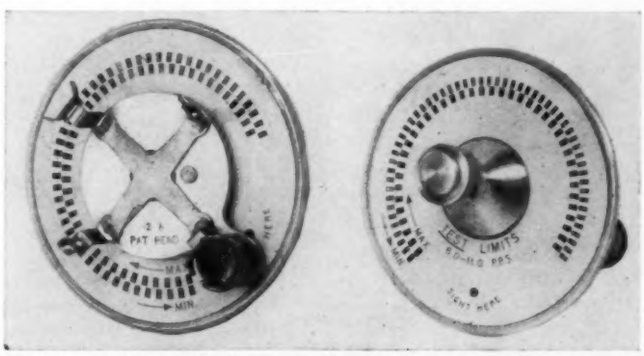


Fig. 1—A target, which can be attached to the finger wheel of a dial, is marked with divisions which are viewed stroboscopically to test the speed of the dial as it unwinds

The accuracy of the device depends on a number of factors, such as the extent to which the speed characteristics of the dial under test conform to the average data used for calculating the targets, and the ability of the user to detect slight movements of the divisions when the speed of the dial is close to the upper or lower limit. On most dials tested, an accuracy of 0.1 to 0.2 pulse per second has been obtained, with an occasional instance showing twice this deviation. This accuracy has been found satisfactory. — *Bell Laboratories Record.*

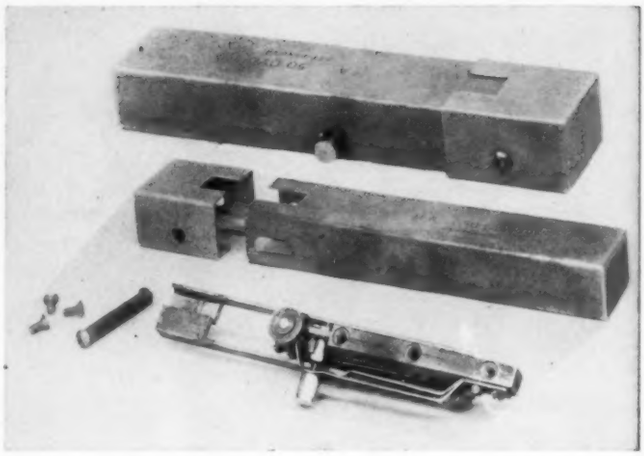


Fig. 2—The divisions on the target (Figure 1) are viewed through the opening in the case, past the prongs of the tuning fork which are set in motion by pressing the button. Each prong bears a shutter, as can be seen at the lower left, and the space between the shutters opens and closes as the fork vibrates.

W. Va. Association Has Fine Convention

Following the adjournment of the convention of the West Virginia Independent Telephone Association, June 13 and 14 at Clarksburg, the officers were highly commended for the splendid convention and the high class program. City Manager Frank J. McAndrew welcomed the officers, delegates and visitors to the city. Vice President H. H. O'Neal of Oak Hill responded. The annual reports of President J. M. Bear and Secretary-Treasurer C. J. McMahon were read and approved.

A. L. Geiger, general attorney, United States Independent Telephone Association, spoke on the original cost accounting and tax-law changes as proposed by the Federal Communications Commission. The talk by Mr. Geiger was well received; many questions were asked and a free debate was had by all in attendance and Mr. Geiger cleared up many difficult problems. Mr. Geiger was accompanied by Charles C. Deering, secretary of the National Association.

Frank L. McKenney, Columbus, Ohio, secretary-treasurer, Ohio Independent Telephone Association, made a splendid talk on the paramount importance of all Independent companies belonging to state Associations and stressed the importance of the telephone people presenting their views individually as well as collectively to their senators and assemblymen.

The secretary of the West Virginia Public Service Commission, N. R. Henderson, stressed the importance of keeping accurate records and accounting systems and quoted considerable new legislation and made detailed explanations of the new laws.

J. K. Buchanan, vice president, Monongahela West Penn Power Co., delivered a splendid address on the Wheeler-Rayburn Bill as affecting holding companies and his points were well taken by the convention.

Instead of the customary after-dinner speeches, members of the C. & P. Telephone Co. entertained the visitors and guests with sound motion pictures on new telephone developments and also had an open house and plant inspection tour of their properties all those who participated therein reported a very enjoyable evening.

President Bear opened the second day's meeting and immediately turned it over to Mr. Deering. Mr. Deering touched on the NRA, the REA and laid especial stress on reduction of fire insurance premiums for those having telephone service on their farms and rural residences.

George I. Graves, connecting company supervisor, C. & P. Telephone Co., made a very impressive talk on sales of telephone service. He also brought considerable stress on good public relations and brought out some very fine points on both subjects.

Round table discussions of local plant, traffic and special commercial matters were discussed freely by delegates present and was substantially and splendidly aided by Mr. Geiger and Mr. Deering.

A vote of thanks was given to the salesmen and representatives of manufacturers for their cooperation. The next convention is to be held in Clarksburg at the call of the president some time in June, 1936.

The following officers wer re-elected: J. M. Bear, Marlinton, president; H. H. O'Neal, Oak Hill, vice president; C. J. McMahon, Wayne, secretary-treasurer; E. H. Booth; Thomas and J. R. Jones, Mole Hill, were elected members of the executive board.

Borman Re-elected By N. D. Association

A sound note indicating that the telephone industry is on the upward trend and emerging from the depression is the revival of interest in the conventions of state Independent telephone associations this year.

At almost every convention, attendance has been greater than several years and those attending the meetings have shown more enthusiasm and confidence than they have exhibited for some time.

This held true for the 28th annual convention of the North Dakota Telephone Association, held May 22 and 23 in Fargo.

M. M. Borman, of Abercrombie, was re-elected president of the association; E. M. Tompkins, Holliday, was elected vice-president, and A. T. Nicklawsky Hillsboro, was re-elected secretary-treasurer.

Two directors were re-elected, namely Mr. Tompkins and G. B. Brown, of Enderlin. F. W. Vail, of Milnor was elected a director to take the place of the late D. L. Vail.

The following are the hold-over directors in addition to the officers named: A. H. Bakken, Northwood; C. F. Carlson, Plaza, and A. F. McAdams, Fargo.

President Borman opened the convention with his annual address, in which he brought out the value and importance of state associations and asked the members of the North Dakota association to get at least one new member.

The report of Secretary-Treasurer Nicklawsky showed that the finances of the association are in sound condition, with all bills paid and a substantial balance in the bank.

The next speaker was F. H. Mc-

Ginnis, commercitl superintendent, Dakota Central Telephone Co., Aberdeen. He spoke on "The Telephone Situation in South Dakota." "The telephone business depends very largely on the farmer; if he suffers, the rest of us are affected also," he said. He reported that soil conditions are very satisfactory due to above normal rainfall and that crop prospects are very favorable.

G. B. Brown, manager, Moore & Liberty Telephone Co., Enderlin, in a very able manner discussed "Management and Operation of a Small Telephone Company," emphasizing billing, collecting and handling old accounts, inside wire plant, outside plant, and the service car.

A. J. McInnes, legislative representative of the association, told about the recent session of the legislature. He said 58 bills directly and indirectly affecting the industry were introduced. Of the six directly affecting the industry, only one became law; of the 52 indirectly affecting the industry, 14 were passed, the remaining 38 being killed in committee.

J. D. Taylor, transmission engineer, Northwestern Bell Telephone Co., discussed "Testing Farm Lines and Instruments."

The first number on the second day's program was a discussion of the state sales tax, by J. J. Weeks, attorney of the state tax department.

C. C. Deering, of Des Moines, Iowa, secretary, United States Independent Telephone Association, discussed the Federal Communications Commission and national legislation affecting the industry.

The afternoon session was addressed by Elmer W. Cart, a new member of the North Dakota Board of Railroad Commissioners, in charge of the telephone division.

The concluding speaker on the program was N. D. Gorman, state county agent leader, who gave a very fine review of crop prospects and conditions over the state.

To Build New Plant

The Continental Telephone Co. is expected to install a $25,000 dial telephone plant at Dresden, Tenn., soon, an application having been approved by the State.

Remodel Plant

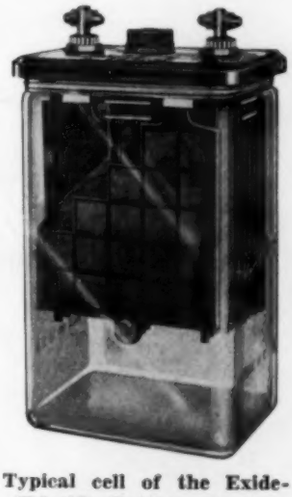
The Schleswig, Ia., Telephone Co. has purchased a building to house the business and a complete remodeling job will be undertaken in preparation for moving from the second story rooms now occupied.

They're going back to WORK

In every community telephone installation figures are rising. These new subscribers are not only more appreciative but more critical of the service offered. They want quicker, clearer and more convenient modern telephone service.

The modern improvements of telephone service demand the absolute reliability of telephone equipment. It must not fail to do its particular part of the telephone job. It must give years of satisfactory service at a reasonable cost.

There is an Exide battery for every telephone job. Whether the work is heavy or light; whether they are floated or cycle charged; Exides assure many years of reliable service.



Typical cell of the Exide-Chloride Battery showing its construction

Exide
BATTERIES
FOR EVERY TELEPHONE USE

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

SOW IDEAS . . . R

It's an old selling axiom that the quickest way to turn prospects into customers is to show them how they can profit by the use of your product. Telephone advertising in national farm papers is planned on just that principle. • A typical advertisement appears on the opposite page. It lists a variety of actual instances in which farmers have used telephone service to definite, dollars-and-cents advantage. Similar advertisements feature the social and emergency values of the farm telephone. • This advertising is planting telephone idea far and wide. The entire industry should share in the harve

REAP CUSTOMERS

HOW THEY USE THE TELEPHONE

A KANSAS farmer has wheat to sell. He telephones Kansas City for prices.

An Iowa farmer who sells his hogs in Chicago calls to find out the price before he ships, that way avoiding a weak market.

A farm woman near Columbia, Missouri, sells dressed chickens by telephone. She finds it an easy way to locate customers.

A Kentucky farmer needs the help of a neighbor in the hayfield. He uses the telephone. It saves him a trip.

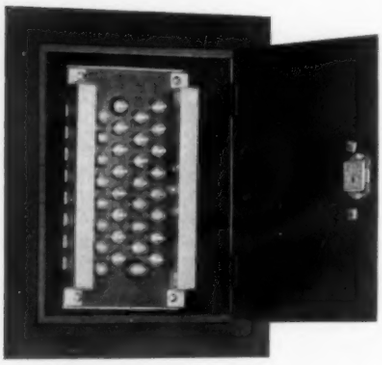
Innumerable are the ways the telephone makes itself useful every day on the farm. It helps find the market where you can sell to best advantage. It sends the word around when there is something doing in the community. It is always ready to summon the doctor or veterinarian in time of emergency. Its value on the farm can hardly be measured in dollars and cents.

BELL TELEPHONE SYSTEM

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

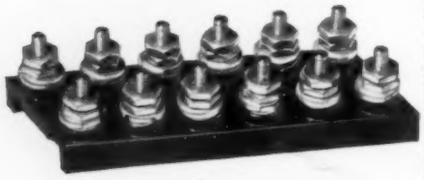
COOK

TERMINAL—PROTECTING AND DISTRIBUTING FACILITIES OF RECOGNIZED VALUE



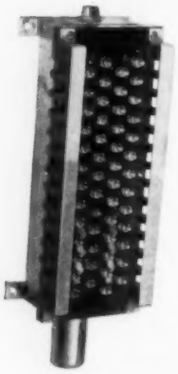
W-X-B

For terminating and distributing lead-covered cable inside of buildings.



TYPE K

Moulded bakelite distributing strip which can be used as a continuous strip from three pairs up.



M-16

For distribution or cross connecting one or more aerial or underground cables. Indoor or outdoor mountings.

X-B

Unprotected terminal for pole mounting 11, 16, and 26 pair sizes.

COMPLETE CATALOG ON REQUEST

COOK ELECTRIC CO.

CHICAGO

"Tapping In" On Washington

(*Continued from page* 13)

States so far as possible, a rapid, efficient, nation-wide and world-wide wire and radio communication service with adequate facilities at reasonable charges."

• ● •

License, Service Contracts . . .

The majority struck hard at the license and service contracts between the A. T. & T. and the Bell companies and at the so-called monopoly of telephone equipment in the Bell System through Western Electric and cited that President Gifford sat on the boards of the A. T. & T. and the Bell companies in making these decisions, noting that a profit or loss by Western Electric is noted in the finances of A. T. & T. It was hinted in the majority opinion that a "local" board of directors for a Bell regional company, not working primarily for the interest of A. T. & T. might find it advisable to purchase equipment in the competitive market rather than from Western Electric. Commissioner Stewart, however, "shoots" this position "full of holes" from a legalistic standpoint by citing that the Communications Act does not carry authority to go into interlocking positions of equipment manufacturing companies and further there is "no overlapping" between the officers of Western Electric and any Bell operating company.

The dissenting opinions take this stand on the license and service contracts and upon the equipment manufacturing phase—that these are subjects into which the Commission is going to conduct extensive investigations in the future, these issues were not a part of the interlocking post jurisdiction. Commissioner Stewart says that maybe these practices are reprehensible, but each case requires examination on its own facts—to our mind that is the logical and judicial way of governmental regulation, to get the facts and then make a decision of approval or condemnation on the basis of the evidence, but not to make generalized charges without showing substantiation through the actual facts of the situation.

• ● •

Walker's Statements . . .

Commissioner Walker, who is in charge of the Telephone Investigation, voiced particularly strong and significant language in his opinion and laid stress upon the holding company dominance, which stifled the independent functioning by the officials of the operating subsidiaries and harmed the public interest through such "long-range domination." He advanced an argument to support his differentiation between the legislative intent of the ICC and the FCC acts by stating that the field of domination by a railway carrier is nowhere so extensive as that of the communications carrier. He pointed out that a railroad is confined to a certain section of the national while the communications carrier's scope is throughout the nation or even the world—the largest rail carriers represent millions of dollars, while the largest communications carrier represents billions.

Some significant statements by Commissioner Walker which have been interpreted to show his aim to pursue a most relentless and searching probe into the telephone industry were as follows:

"No Congress had in mind some attempt to subject these concerns to the control of the laws of the country."

"No top company should be allowed to law nation-wide plans that bolster rates and defeat effective regulation in the states."

There have been rumors current in Washington that the A. T. & T. investigation is to be conducted and completed so its major results can be used during the 1936 presidential campaign, when the utility holding company is to be a leading political issue. The fact that Ferdinand Pecora, who gained game in his senate banking investigation, was asked by the president to be telephone special counsel, is interpreted that this deduction is soundly based.

• ● •

No Test in Sight . . .

The FCC interlocking decision may or may not meet a court test—it would be difficult to upset a Commission "negative" action under its own interpretation of its law in a court. But one feels that the decision is "futile" and bars the way for any approval of interlocking positions, as the two dissenting Commissioners said. It was also noted by the dissenting Commissioners that the officials, prohibited from these posts, were outstanding leaders in their field and the result of the decision might be that they would be replaced by subordinate officials of lesser ability or at any rate in the case of interlocking officers there would be a duplication of effort and waste of expenses. The futility of the action can be predicated on the fact that the new directors and officers of wholly controlled companies will be men of the choosing of the parent company so no actual difference of policy determination will result.

It is to be hoped that the FCC majority felt their interpretation of the law was the actual intent of Congress (that position can be bolstered through the Splawn Report findings). But one cannot help but feel that the FCC had its "ear" to the political sounding board of Congress which then was heatedly engrossed in the utility holding company bill. The Commission could have better limited the number of interlocking posts for each official, then made its investigations of the so-called abuses of holding companies and after obtaining the facts sternly prohibit all such interlocking relationships which it had found violated the public interest.

We are still talking "ECONOMY"

THERE are many reasons why this famous group of pliers should be the choice of Purchasing Agents in the telephone field — refinements of design and exclusive features that make them a one-hundred per cent efficient tool from the lineman's standpoint.

But over and above their "technical perfection" the one big reason why you should adopt them as standard is comprised in the single word—"Economy." No other pliers of their type represent such a LOW COST, measured by actual length of life.

30-DAY TRIAL PLAN

A plan that enables you to prove by means of running tests, without risk of loss, that Vacuum Grip Lineman Pliers will effect a substantial saving in your annual pliers budget. Write today.

FORGED STEEL PRODUCTS CO.
Newport, Pa.

Professional Lineman Pliers

No. 58–R — Improved pattern. Tapered nose for confined spaces. Double bevel cutters. Insulation strippers in handles.

Length 8½" — $3.25
57–R — 7" — $2.50
56–R — 6" — $2.00

Name electrically etched on handle of each pair, FREE.

Special prices on lots of ½ dozen or more.

Vacuum Grip Pliers

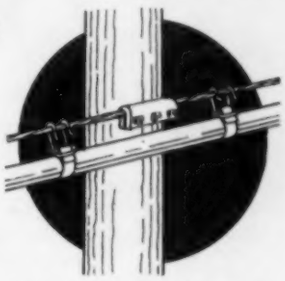
BUILT UP TO A STANDARD — NOT DOWN TO A PRICE

OVER A MILLION IN USE

ELIMINATE RING CUTTING

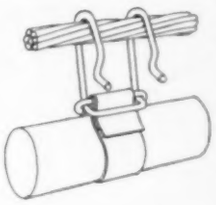
Close to the Pole with

NATIONAL ZINC CABLE CLIPS



While ring cutting is practically eliminated by the use of National Cable Rings it is still experienced to some extent by most companies close to the poles. The use of National Zinc Cable Clips to replace the two rings on either side of the poles will entirely eliminate this trouble.

The National Zinc Cable Clip assembly provides a wide surface for the cable to rest on and the design of hooks allows necessary play as cable vibrates, expands and contracts. The installation of these cable clips on either existing cable or new installations is simple and easy. Write for samples, prices and complete information.



THE NATIONAL TELEPHONE SUPPLY CO.
5100 SUPERIOR AVE., CLEVELAND, OHIO

Coffing Hoists

"The Universal Tools"

Telephone Linemen Find the Model A COFFING HOIST Invaluable for Pulling Guy Wires, Messengers, Underground Cables, etc.

The Model A COFFING HOIST only weighs 14 pounds, is rated at ¾ ton and tested to 100% overload. Also made in 1½, 3 and 6 ton sizes. We manufacture a variety of line equipment. Catalog furnished upon request.

Coffing Hoist Company
DANVILLE -:- ILLINOIS

Crapo GALVANIZED PRODUCTS

Crapo Galvanizing — Indiana Steel & Wire Co. — Muncie, Ind.

Line Gangs Know from Actual Experience

MEN in the field recognize the outstanding advantages of *Crapo* Galvanized Telephone Wire and Steel Strand. They know from experience that these dependable products can be spliced without injury to the heavy, *pure* zinc galvanized coating; that they are easily and quickly served; that they last longer in actual service under all conditions. For long life and low maintenance costs, specify genuine *Crapo* Galvanized Wire and Strand on all new and replacement jobs! Their superiority in actual service is a matter of record in the engineering offices of some of America's leading public service companies.

Indiana Steel & Wire Company
Muncie, Indiana

Telephone and Telegraph Wire

• • •

Steel Strand

"O.K."

WRITE EXCHANGES THE COUNTRY OVER!

- **Gratifying, indeed, are the comments of Exchanges that arrive daily praising the TWIN-SIX. "Square, compact shape made a hit with our linemen." "Two connections instead of four mean more reliable service." . . . . Etc.**
- **In short, the TWIN-SIX is the talk of the telephone industry. Replacing two old No. 6's with *one* battery is *a real advance.* And that just about explains why more Exchanges every day are going "TWIN-SIX."**
- **Price is attractive, too—39¢ each (47¢ west of Rockies), terms 5% 10 days, net 30. Orders for 30 or more will be shipped F.O.B. your Exchange. Order today from Inland Equipment Company.**

BURGESS
TWIN-SIX
TELEPHONE BATTERY

INLAND EQUIPMENT CO., (Distributors)
MAX F. HOSEA, President, INDIANAPOLIS, IND.

N. Y. Association Changes Name

After operating as the Up-State Telephone Association of New York for many years, telephone men of the Empire State voted to change the Association's name to New York State Telephone Association at their annual convention held May 22 and 23 in Syracuse.

The attendance at this year's convention was about the same as last year and it was made up mainly of representatives of smaller companies. There was distinctly a better feeling among the delegates and many gains in stations were reported. While rapid and large gains are not evident in the state, there has been a steady increase over last year.

The following directors were re-elected by the convention:

J. B. Boylan, president and general manager, Rochester Telephone Corp; F. D. Fancher, general manager, Orange County Telephone Co., Middletown; H. H. Griswold, president, Ontario Telephoe H. Griswold, president, Ontario Telephone C., Phelps; J. G. Ihmsen, Albany; A. R. Maytum, geenral manager, Dunkirk & Fredonia Telephone Co.; L. H. Meyer, general manager, Up-State Telephone Corp. of New York, Johnstown; C. B. Sayer, president, Chatham Telephone Corp.; W. A. Seely, general manager, Chenango & Undilla Telephone Co., Norwich ;and John Troy, manager, Red Hook Telephone Co., Rhinebeck.

All officers also were re-elected. They are: President, Mr. Boylan; vice-president and general manager, Mr. Ihmsen; secretary, Mr. Griswold; treasurer, Charles M. Beattie, treasurer of the Rochester Telephone Corp.; and assistant secretary and assistant treasurer, S. G. Bowie, Rochester.

The convention was opened with an address by Lawrence Dan, manager New York Fire Insurance Rating Organization, Syracuse, who discussed "Fire Protection and Prevention." He emphasized the value of telephone service in fire protection.

F. B. MacKinnon, president, United States Independent Telephone Association, discussed the national situation as it applies to the telephone industry, emphasizing the revised FCC accounting system and other activities at Washington.

Samuel Ferguson, chairman, Hartford Electric Light Co. and director of the Columbia and Rensselaer Telephone Co., West Lebanon, was the principle speaker at the annual banquet. He discussed the holding company legislation originated by Senator Wheeler and Representative Rayburn.

The first speaker on the second day's program was Prof. Finla G. Crawford, school of citizenship, Syracuse University. He spoke on "Public Utility Control."

"A Few Rambles in Tax Land" was the subject of an address by C. C. Chappell, president, Orangae County Telephone Co., Middletown.

At the afternoon session B. K. Boyce, chief engineer, New York Telephone Co., presented "New Developments in Telephone Transmission."

The concluding address of the convention was by Dr. J. O. Blew, New York State College of Forestry, Syracuse University, who spoke on "Prolonging the Life of Poles."

Alabama Association Completes Organization

The Alabama Independent Telephone Association completed its organization at Greenville, on June 18, electing the following officers:

President, G. A. Crenshaw, Greenville; First Vice President, W. H. Vaughan, Florala; Second Vice President, B. H. Stallworth, Monroeville; Third Vice President, P. G. Mathis, Elba; Secretary-Treasurer, R. H. Liddell, Camden.

Acting as an executive committee, the officers decided to hold a get together meeting on October 15 in Montgomery.

F. M. Boardman Resigns at Nevada, Iowa

F. M. Boardman, who for the past 36 years has been in charge of the telephone exchange at Nevada, Ia., has resigned and will be succeeded by Edward Carlson of Fairmont, Minn.

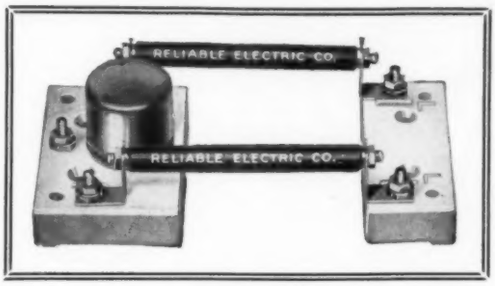
At the time of the organization of the Nevada Mutual Telephone Co. 36 years ago, Mr. Boardman was made secretary and manager and the development of the property has been under his personal attention. In 1927 the company was purchased by the Iowa Continental Telephone Co., Mr. Boardman continuing as manager.

Failing health and the need of giving more attention to his private affairs has made the resignation of Mr. Boardman advisable.

National Convention Date

F. B. MacKinnon, president of the United States Independent Telephone Association, has announced that the annual convention of the Association will be held October 8, 9, 10 and 11 at the Stevens Hotel, Chicago. As in the past two years, all sessions will be held in the Tower Room and manufacturers' and registration headquarters will be on the 25th floor.

Reliable



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LISTED AS STANDARD BY THE UNDERWRITERS LABORATORIES.

ADOPTED BY MANY OF THE LEADING TELEPHONE COMPANIES IN U. S. AND ABROAD.

Reliable Electric Company

3145 Carroll Ave. Chicago, Ill.

Ok ON NATURE'S *proving ground*

There's no proving ground like actual experience. And that's where Hemingray Insulators — made of improved, tougher glass — demonstrate the ability to pass all of nature's tests as they come ... heat ... cold ... storm ... age. Hemingray Insulators are unaffected by seasonal or sudden temperature changes. They are homogeneous in character with only one coefficient of expansion. Write us about your requirements. Owens-Illinois Glass Company, Hemingray Division, Muncie, Indiana.

Ok

FOR LONG LIFE

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OWENS-ILLINOIS

HEMINGRAY

PIN TYPE GLASS

INSULATORS

Phillips Telephone Cords for Economy

Both by repeated tests as well as under actual conditions of service, Phillips telephone cords show an extraordinarily low cost per year of service life. This is because of the exclusive method of construction used and the careful selection of materials with which they are built.

Everybody knows how ragged and frayed ordinary cords soon get. Phillips cords do not begin to show signs of wear until long after others have been discarded. They are covered with a newly-developed, tightly-woven material to form a compact, smooth, silk-like braid, which retains its attractive appearance even after years of hard service.

Phillips cords will not form a permanent kink. Thus another frequent source of wear is eliminated. And their insulation resistance is not only high to begin with, but remains high even under the most severe conditions.

For a new experience in cord economy, specify Phillips cords on your next requirements.

•

PHILLIPS PRODUCTS INCLUDE:—Bare and Insulated Copper Wires—Rubber Insulated Wires—Enameled Wire—Magnet Wire —Power Cables—Switchboard Cables—Paper Insulated Cables — Flexible Cords — Electrolytic Copper Rods, Shapes, etc.

EUGENE F. PHILLIPS ELECTRICAL WORKS, LTD.

ESTABLISHED 1889

Brockville, Ontario, Canada

FACTORIES — MONTREAL AND BROCKVILLE

CABLE ADDRESS: PHILELEC, BROCKVILLE

Distributors for Canada: Canadian Telephones & Supplies, Limited, Toronto, Winnipeg and Vancouver.

Michigan Independents Form Association

A very enthusiastic group of Michigan telephone men and women met in Hotel Olds in Lansing, Mich., on June 4, to organize a state association. The gathering included 44 individuals representing their respective companies.

The meeting was called to order by F. B. MacKinnon, president, United States Independent Telephone Association, who explained the Washington situation as it applies to telephone companies and naming the real causes leading up to the formation of the Federal Communications Commission.

Upon the conclusion of his informative and instructive talk, Mr. MacKinnon explained the purpose of the meeting and told why the Independent telephone companies in Michigan felt that an Independent telephone association in that state was a necessary and vital activity.

The meeting then being thrown open for informal discussion of the subject, it was participated in by W. J. Melchers, vice-president and general manager, Union Telephone Co., Owosso; Dr. O. M. Vaughan, president, Tri-County Telephone Co., South Haven; and B. R. Sage, general manager, Traverse Bays Telephone Co., Central Lake.

A motion was made, seconded and carried that an Independent telephone association be organized. Another motion was then made and carried that the chairman of the meeting appoint a committee to prepare a constitution and by-laws and complete the organization of the Michigan Independent Telephone Association.

The following members of this committee were named: Dr. O. M. Vaughan, of South Haven; W. T. Bradstreet, of Hudson; B. R. Sage, of Central Lake; Charles W. Cheeney of Chesaning, and W. J. Melchers, of Owosso.

When the afternoon session had been called to order a very interesting talk was presented by William M. Smith, of Lansing, chairman of the Michigan Public Utilities Commission, in which he welcomed attention to some of the work that might be accomplished by the organization.

The report of the organization committee was accepted and the constitution adopted as presented.

The officers elected are as follows: President, O. M. Vaughan, South Haven; vice president, W. J. Melchers, Owosso; director from district No. 1, F. G. Moore of Muskegon; director from district No. 2, Chas. W. Cheeney of Chesaning; director from district No. 3, B. R. Sage of Central Lake; director from district No. 4, P. E. Taylor of Pickford.

Among those present at this meeting who became charter members of the New Michigan association, were the following.

B. R. Sage, Traverse Bays Telephone Co., Central Lake; C. E. Smith, Morenci Telephone Co., Morenci; W. F. Bradstreet, Rollins Telephone Co., Hudson; Geo. H. Clark, Rollins Telephone Co., Manitou Beach; Chas W. Cheeney, Chesaning Home Telephone Co., Chesaning; Fred E. Bohn, Eaton County Telephone Co., Charlotte.

R. C. Smith, Calhoun County Telephone Co., Goshen; Charles Gardner, Calhoun County Telephone Co., Homer; V. L. Cole, Hillsdale Telephone Co., Osseo; Ray E. Kelly, Hillsdale Telephone Co., Pratville; Jay C. Gear, Hillsdale Telephone Co., Ransom; O. M. Vaughan, W. A. Dickinson, F. H. White and A. B. Chase, Tri-County Telephone Co. South Haven; B. F. Hadley, Hadley Telephone Co., Hadley.

Fred T. Consear and Arthur L. Phillips, Whiteford Farmers Telephone Co., Ottawa Lake; C. N. Wilber, Mecosta Telephone Exchange, Mecosta; Mrs. Henry F. Hoyt, and Miss Carrie Parmelee, Alamo Mutual Telephone Co., Alamo; S. L. Whisler, Waldron Telephone Co., Waldron; John Sattler, Home Telephone Co., Cedar; R. M. Bascom, Sunfield Telephone Co., Sunfield; E. F. Henne, Saline Telephone Co., Saline, W. J. Melchers, and J. A. Bridgeman, Union Telephone Co., Owosso.

Carl W. Snyder and E. L. Gaines, American-Automatic Electric Sales Co., Ft. Wayne, Ind.; Clyde Parsley and R. H. Burfeind, American - Automatic Electric Sales Co., Chicago; M. A. Bellion, Kellogg Switchboard & Supply Co., Chicago; G. A. Berting, North Electric Mfg. Co., Galion, Ohio; Frank L. Eldridge, Ray-O-Vac Co., Chicago; Geo. W. Rodormer, Reliable Electric Co., Chicago, and Paul D. Myers, Stromberg-Carlson Telephone Mfg. Co., Indianapolis, Ind.

Since the Earliest Days of this Century

Thirty-five years of concentration on the problem of producing the best possible Telephone Wire. Thirty-five years of improving manufacturing methods, of checking and improving construction and materials. Thirty-five years under the acid test of actual use by hundreds of Telephone Companies throughout the world. When you buy Whitney Blake Telephone Wire you buy more than conductor and insulating material.

Telephone Wire

RUBBER COVERED
COPPERWELD - BRONZE - COPPER
DROP - INSIDE and BRIDLE

MANUFACTURED BY

The Whitney Blake Co.

SOLE SELLING AGENTS IN U. S. A.

Graybar

ELECTRIC COMPANY

FOREIGN DISTRIBUTORS: *International Standard Electric Corporation*, 67 Broad St., N. Y. C.

Line & Desk; Questions and Answers

(*Continued from page* 18)

under the conditions you mention. There is a possibility that you have some low insulation and we suggest that it be tested with this in view. A splicer may have been careless in boiling-out a splice or not boiled it out at all a second time after splicing the conductors and slight moisture from the perspiration of his hands may be causing the crosstalk trouble. There is a slight possibility also that your grounded lines are picking-up some peculiar frequency from earth currents or induction which is causing noise through the entire cable. We prefer to operate grounded lines metallic through the exchange cables when possible.

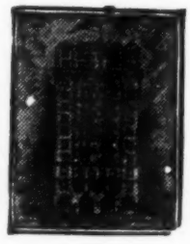
Ask Your Jobber About

The New Deluxe Dillon Temperometer

The instrument which eliminates all guesswork in heating wiping solder, waxes, paraffin, and compounds. Every cableman needs one.

DILLON MFG. CO.

63 E. LAKE ST. CHICAGO, ILL.



ALL THE COMFORTS OF HOME MAY BE FOUND AT

THE BROZTELL

A Distinctive Hotel

It is easily accessible to shopping and theatrical centers, churches, libraries, parks and transportation lines.

Ladies traveling without escort will appreciate the atmosphere of security and rest it offers.

Every room with tub and shower.

ROOM WITH BATH $1.50

HOTEL BROZTELL

Fifth Avenue & 27th St., N. Y.

J. SUGARMAN, Manager

TELERING

Only ONE Contact!

Price $44.00
F.O.B. factory

For better and cheaper ringing.

No Radio Interference

30-day free trial

TELKOR, Inc.
ELYRIA, OHIO

(See our space in next month's issue)

TELEPHONE ENGINEER

Classified Advertising Pays

Cable

...and 60,000 other items

WHERE dependability counts—only the highest quality electrical products will do. One such quality product is Western Electric Lead Covered Cable—a cable whose dependability is insured by the most exacting of manufacturing standards.

But that's not all. Out of its roster of 60,000 electrical items, Graybar is prepared to meet *any* need of a telephone industry. And behind *every* Graybar item stands the Graybar reputation for quality that goes back 66 years.

GraybaR

OFFICES IN 77 PRINCIPAL CITIES
EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

STURGIS

TRUE POSTURE

Operator Chairs

Easy
Quick
Adjustments

No. 426

A true posture chair designed to increase efficiency, mental alertness, reduce fatigue, improve the health and comfort of the operator.

Write For Particulars

Available in 3 Different Heights.

Distributed by

STROMBERG-CARLSON TELEPHONE MFG. CO.

100 Carlson Road, Rochester, New York

Manufactured by

STURGIS POSTURE CHAIR CO.

Sturgis, Mich.

SHALLCROSS

WHEATSTONE BRIDGE

RELIABLE

INEXPENSIVE

Range 0.01 Ohms to 11.1 Megohms

This Wheatstone Bridge is built around a highly sensitive galvanometer and Shallcross Resistors.

A simple and rugged yet accurate instrument capable of measurements encountered in the telephone field from 0.01 ohms to 11.1 megohms.

Send for Bulletin No. 631-N describing this instrument.

SHALLCROSS MFG. CO.

COLLINGDALE, PA.

Friends Mourn Passing S. P. Grace

The many telephone friends of Sergius P. Grace, assistant vice-president of the Bell Telephone Laboratories, were grieved to learn of his death which occurred June 23, at his home in Rye, N. Y.

Mr. Grace, widely known for his demonstration lectures of scientific developments, started his telephone career immediately after his graduation from the University of Michigan in 1896, when Mr. Grace started to work for the Detroit Telephone Co. A few years later he went to New Orleans as chief engineer and operating manager of the People's Independent Telephone Co. While there he successfully attacked the difficult problems of constructing underground telephone plant below the level of the Mississippi River.

He joined the general engineering staff of the A. T. & T. Co. in 1902, when the headquarters of that company were in Boston.

From 1913 to 1915, Mr. Grace served as chief telephone engineer to the Public Service Commission of New York. For the next five years he was assistant chief engineer of the New York Telephone Co. and then returned to the A. T. & T. as engineer on foreign wire relations. In 1924 he transferred to the laboratory unit of the System and in 1928 was appointed assistant vice-president. He will be remembered by thousands as director of the Bell System exhibit in 1933 at the Century of Progress Exposition.

Missouri Convention Best In Years

The annual convention of the Missouri Telephone Association held in Kansas City May 27 and 28 was the best convention held in that state in many years. This was the concensus of opinion of the enthusiastic and confident telephone men and women attending the meeting.

Secretary R. W. Hedrick produced an outstanding program which was appreciated and enjoyed by the "Show Me" telephone people.

First Vice President A. M. Benedict of Richards presided at all convention sessions in the absence of President Houck McHenry of Jefferson City because of illness.

The convention was called to order Monday afternoon, May 27 by Vice President Benedict. He expressed regret over President McHenry's illness and paid high tribute for his faithful leadership of the association since 1913.

A telegram of felicitation was sent to Mr. McHenry and he extended his

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greetings and good wishes to the convention by wire.

Following an interesting address by Acting President Benedict, George H. English, member Missouri Public Service Commission, spoke on "The Relations of the Commission to the Telephone Industry."

"Commercial Practices, Old and New" was the subject of an address by J. B. Haley, general manager, Western Telephone Corp., Kansas City.

M. L. Galladay, Holden, gave a very interesting talk on "Rambling Reminiscenes of a Has-Been."

Tuesday's session was opened by H. H. Hillyer, president, Citizen's Public Service Co., of Missouri, who read a paper by R. E. Novak, accountant and auditor, entitled "Small Company Accounting." Mr. Novak was unable to attend because of illness.

F. B. MacKinnon, president, United States Independent Telephone Association discussed the work of the FCC and the National Association's activities in behalf of the industry.

An operators' conference, under the direction of P. P. Cheatham, toll supervisor, Southwestern Bell Telephone Co., was the next feature on the program. The "Tributary and C. L. R. Operating Demonstration" by Mr. Cheatham and his assistants was well received by the 100 who attended the conference.

Following the conference the following officers were elected: President, Houck McHenry, Jefferson City; first vice president, A. M. Benedict, Richards; second vice president, W. R. Journey, Higginsville; third vice president, T. R. Schweer, Rolla and fourth vice president, Elmer Weakley, Plattsburg and secretary and treasurer, R. W. Hedrick, Jefferson City.

Mr. Benedict, A. J. Roberts, Kansas City and C. A. Ulffers, Kansas City, were elected to the executive committee.

W. E. To Pay Off Bonds

Directors of Western Electric Co. voted June 20 to redeem on October 1, at 105 and accrued interest the entire issue of $35,000,000 5% gold debenture bonds outstanding. In the meantime the company will accept these bonds at the same price with interest to date of presentation.

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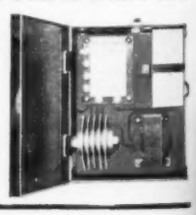

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